

Nordberg Cone Crushers MP[®] Series Cone Crushers





MP800

MP1000

MP800



Providing a Competitive Edge Through Greater Capacity & Efficiency

Increasing capacity without significantly increasing operating costs—that's the goal of mining and aggregate producers throughout the world. Metso's Nordberg MP Series cone crushers put that goal within easy reach. MP stands for maximum power, and no similarly-sized conventional crusher can match the performance of the MP1000 or the MP800.

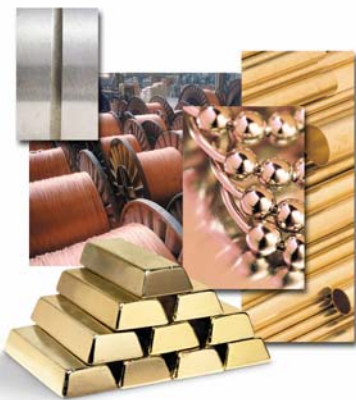
The MP Series' patented design reflects Metso's leadership in crushing technology. Compact yet rugged, the MP Series delivers up to twice the capacity per crushing station when compared to the competition: 100 percent more per crushing station for the MP1000 and 80 percent more for the MP800. Yet productivity is only one of the MP Series' benefits. Design features that include a rotating bowl, automatic tramp release, and large unrestricted feed opening help ensure that MP cone crushers perform consistently, no matter what the application.

A track record of success

From the first day they were introduced, the MP Series cone crushers have transformed the possibilities for secondary and tertiary crushing in large mining operations. Metso's decades of experience in the design and manufacture of cone crushers has created a quantum increase in productivity coupled with cost-effective operation and ease of maintenance. Whether intended for a new operation or as a replacement, an MP1000 or MP800 improves the entire comminution circuit.

Successful applications include:

- Secondary and tertiary crushing for feeding grinding mills and leach pads.
- Critical-size material crushing to achieve optimum autogenous or semi-autogenous mill productivity.
- Special secondary crushing for high reduction ratio applications.



Maximizing Crushing Performance

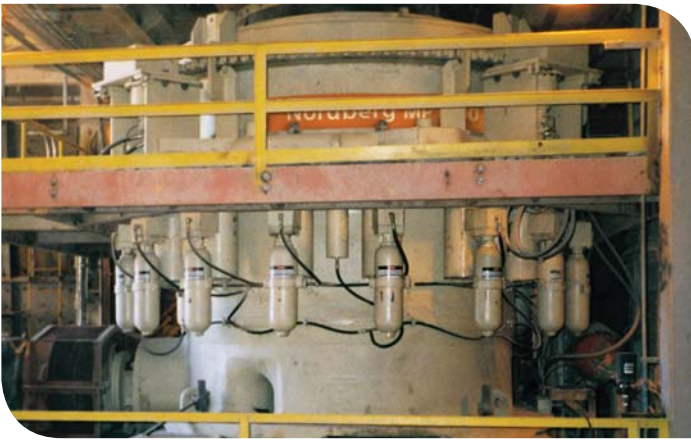
MP stands for maximum power, and no similarly-sized conventional crusher can match the performance of the MP1000 or the MP800.

Productivity

The MP Series' unique design incorporates the best in process technology to produce the highest crushing force in the industry. With field-proven technology in demanding mining operations, the MP1000 and MP800 can process more ore to the same reduction or the same quantity of ore to a finer reduction than any competitive unit. Yet each is designed to fit onto a 7 ft. Symons cone crusher foundation. That translates into higher productivity with substantial savings in plant modifications or building and foundation costs.

Consistency

Consistent performance means a crusher that can accept variation and deliver uniformity. The MP Series can be relied on for unparalleled consistency due to a number of features. Hydraulic controls allow the crushers to hold a constant setting while achieving unusually high reductions. A rotating bowl provides even wear in the crushing cavity while enabling crusher setting uniformity and consistent size reduction. The automatic tramp release passes tramp material without stalling the crusher, permitting an instant return to the production setting.



As a secondary crusher, this MP1000 installation is critical to the success of the downstream milling operation.



Hydraulic clearing and tramp release ensures high availability and durable performance.

Thus uniform reduction is maintained. Each of these features also contributes to an efficient use of crushing energy, which makes the entire mining operation more profitable.

Metso's decades of experience in the design and manufacture of cone crushers has created a quantum increase in productivity, coupled with cost-effective operation and ease of maintenance.

Adaptability

The MP Series is designed to operate at various speed and cavity combinations to meet a wide range of requirements. One head for all cavities further enhances the MP Series' application capabilities, while reducing standby spares. The crushers' large unrestricted feed opening with a high pivot point creates an active feed opening that is able to adapt to increasing feed size. This is a critical feature for secondary crushing or pebble crushing where feed size can vary dramatically. Plus the commonality of spares and the ability of the short head bowl to accept coarse feeds translates into low-cost spares support.

Reliability

Time lost in disassembly and maintenance is time lost in production. The MP1000 and MP800 incorporate features such as hydraulic cavity clearing and easy setting adjustment. These minimize downtime, helping ensure that the crushers are available whenever they are needed. The MP Series makes routine maintenance simple with user-friendly components. Push a button and watch the crusher either adjust-under-load or disassemble for maintenance. All aspects of the MP Series have been designed to maximize cost-effective operation.

Achieving a Higher Standard

Uniform production

The MP Series' rotating bowl compensates for feed segregation or uneven feed rates, and permits operation of the crusher in a non-choke fed condition. Even wear in the crushing cavity avoids localized restriction of the feed opening, maintains a uniform crusher setting, and achieves consistent size reduction. The hydraulic motor and gear drive adjustment provides finer control of the setting: the setting can be easily adjusted under load to compensate for liner wear without turning off the feed.

High availability

The fully automated hydraulic tramp release passes uncrushables instantaneously. The release system maintains the crushing force and automatically returns the crusher to its

production setting after a tramp occurrence. A more reliable automated tramp release is not found on any other crusher. The crusher's availability is further enhanced by its hydraulic clearing system. Its large vertical stroke allows material to fall easily. And the large release and clearing stroke capability remains the same throughout liner life. Hydraulic rotation of the bowl provides additional cavity clearing, if needed.

Ease of operation

Push-button controls help make the MP1000 and MP800 easy to operate. The hydraulic motor permits setting adjustments in small increments to compensate for wear. Adjustments can also be made remotely via a control system. In addition, new "force" sensors pioneered by Metso indicate that safe

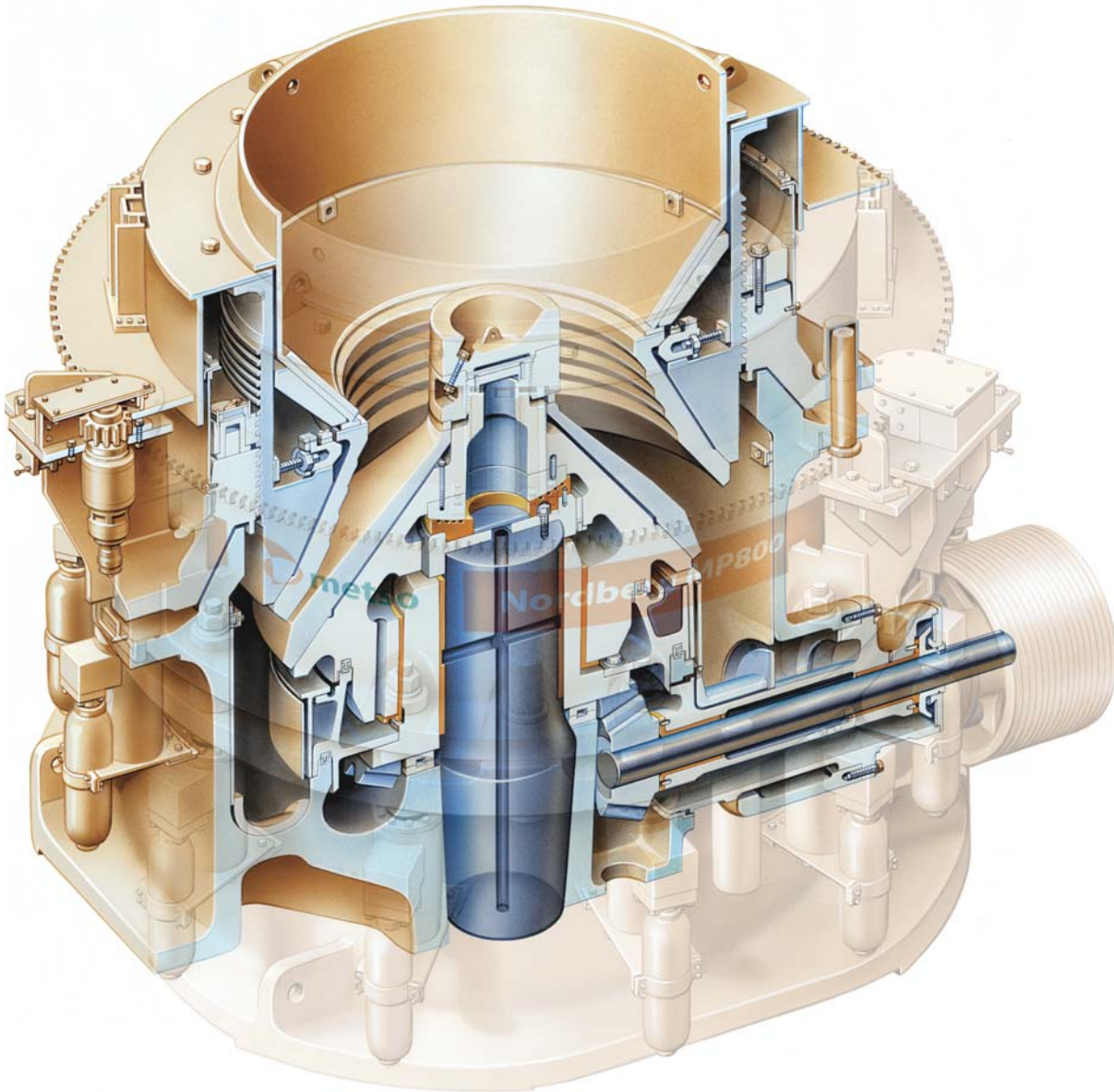
operation continues after setting adjustment is initiated either by the operator or expert system.

Simple maintenance

The MP Series features push button disassembly for routine maintenance. If necessary, modular components can be easily replaced. Durable bronze bushings are used throughout the crushers, ensuring superior load capability in the demanding crushing environment. Proven "wedge" retention of the bowl liner provides a secure and simple method of retaining the liner. It also allows for easy and efficient liner replacement.

A uniform crusher setting achieves consistent size reductions. The release system maintains the crushing force and quickly returns the crusher to its production setting after a tramp occurrence.





Designed-in Quality and Performance



MP Series crushers out-perform the competition because ruggedness and superior crushing ability are designed into every component. The attention paid to every detail of every feature in the design and engineering process is the reason the MP Series can sustain high crushing forces day after day, with almost no maintenance.

Frame and Mainshaft

A The cast mainframe is ruggedly designed to support maximum crushing loads and is manufactured to precise metallurgical and heat treatment specifications. High-strength steel materials ensure durability under severe crushing conditions.

B The pedestal-type main shaft is rigidly held in a tapered bore in the center of the crusher frame. The main shaft is forged of high-strength alloy steel.

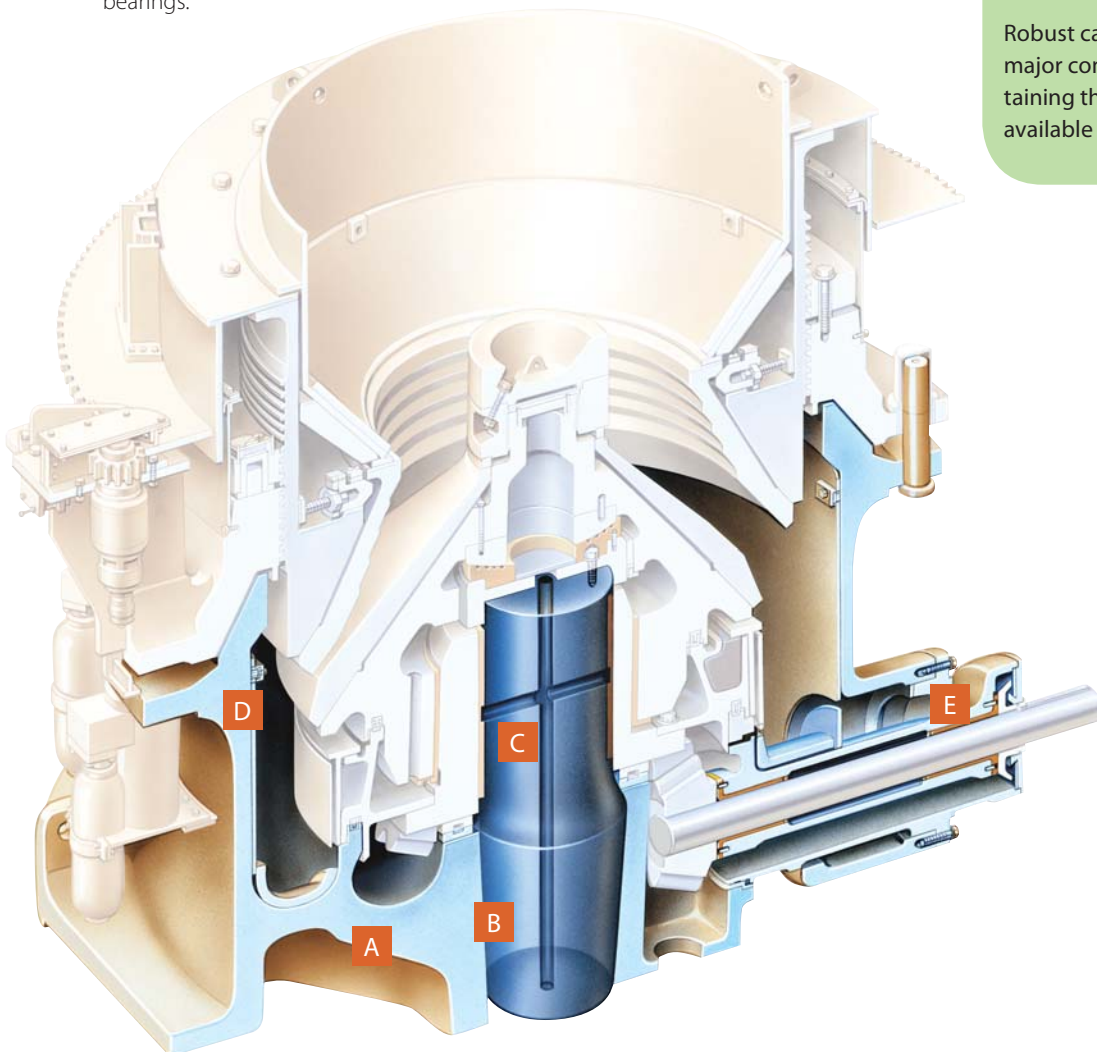
C The main shaft provides distribution of oil to various high-performance bearings.

D Abrasion-resistant wear liners and guards provide extra protection to areas exposed to material passing through the crusher. Arm and counter-shaft box guards are cast from hi-chrome Ni-hard wear resistant alloy. The mainframe liners are bolted to the mainframe for easy replacement.

E The counter-shaft assembly is supported on bronze bushings. The entire counter-shaft box assembly is removable for easy maintenance.



The MP800 is an excellent choice for upgrading crushing plants. The MP can process more material (or process the same amount with greater reduction) than the competition and still fits neatly on your existing foundation.



Robust cast and forged design of all major components capable of sustaining the high crushing forces are available with MP-type crushers.

Rotating Assemblies

A Hardened gears are utilized to provide a high power rating for strength and durability based on AGMA standards. Gears are forged to ensure maximum durability. Special alloys are selected to achieve desired hardness.

B The counter-shaft is made of high-carbon steel to provide strength for dependable power transmission.

C The high-performance non-contacting labyrinth T & U seals provide a long life and maintenance free means of preventing dust from entering the crusher. A positive air flow prevents contamination of lube oil.

D Major load-bearing surfaces are located above the T & U seals which makes sure the freshly filtered oil remains free of contaminants.

E The main journal bearings are long-lasting, low-cost bronze bushings capable of withstanding high crushing loads and severe operating conditions. The high magnitude forces are supported utilizing full-film hydrodynamic lubrication. The lower head bushing is flanged for positive retention and ease of maintenance.

F The eccentric assembly has been designed with a counterweight to reduce the unbalanced forces created by the rotating eccentric and the gyrating head. The high throw of the eccentric assembly provides maximum throughput and crushing efficiency for both coarse and fine crushing applications.

G The bronze socket liner provides maximum head support and multiple oil grooves for full lubrication of the gyrating head ball.

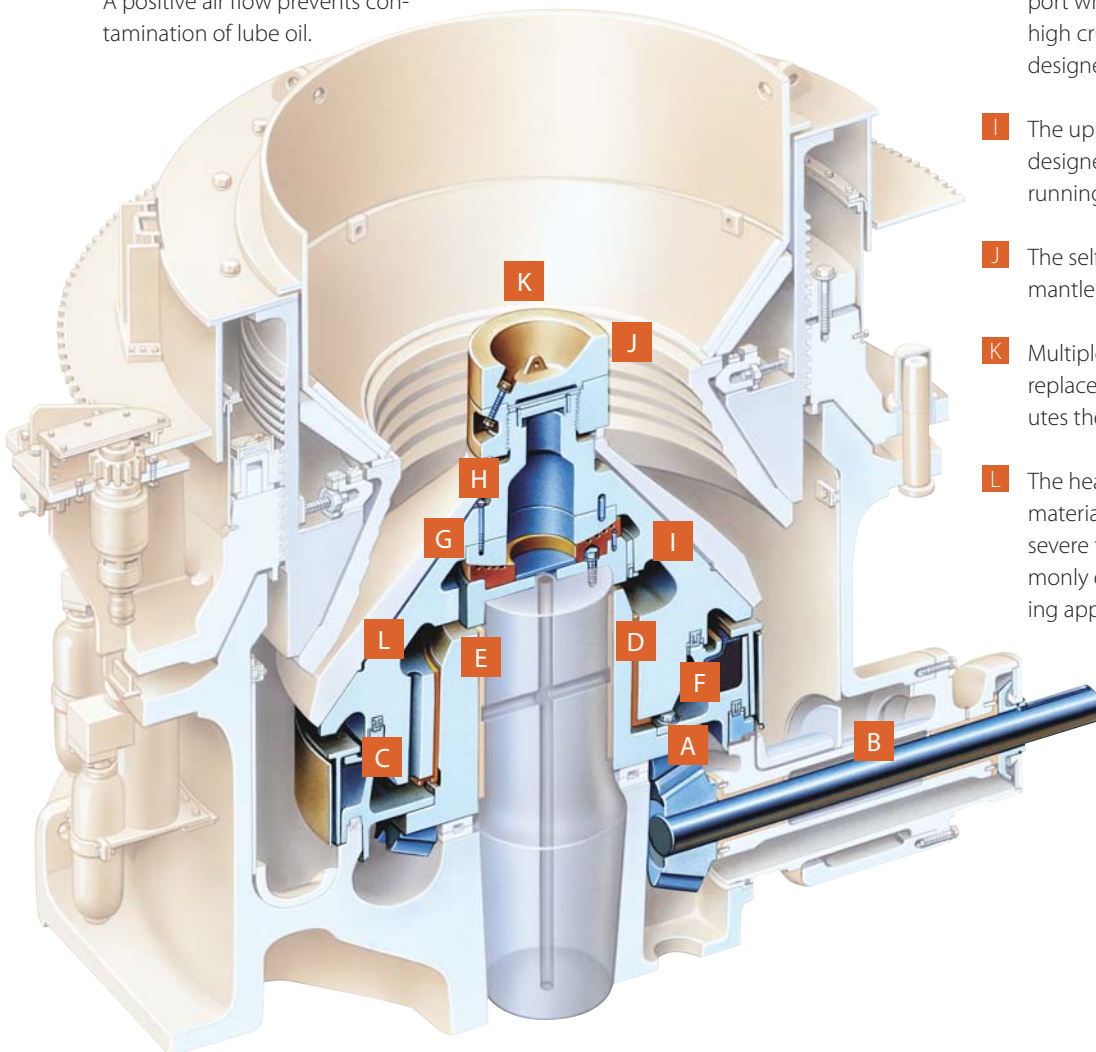
H The head ball provides a spherical support which is capable of sustaining high crushing loads. The head ball is designed for easy replacement.

I The upper head bushing is uniquely designed to reduce head spin when running without a crushing load.

J The self-tightening lock-nut retains the mantle during the high cavity forces.

K Multiple feed plate designs provide a replaceable wear surface which distributes the incoming feed.

L The head is cast using a high-strength material and has proved to withstand severe tramp metal conditions commonly encountered in high-force crushing applications.



Motion, Adjustment and Tramp Release

A The crushing cavity and unique head motion usher constant performance even as crushing parameters change. Cavity design is based on years of crushing experience in a wide range of applications from coarse to fine crushing. Metso provides follow-up service by providing customized liner designs. Liners are selected or designed to meet customer requirements for throughput, size reduction and particle shape.

B The MP cone begins crushing the material at a high ratio of reduction immediately upon entry into the crushing cavity. This active crushing motion at the top of the

crushing cavity prevents bridging of the cavity which commonly is encountered in machines with a more restricted head motion.

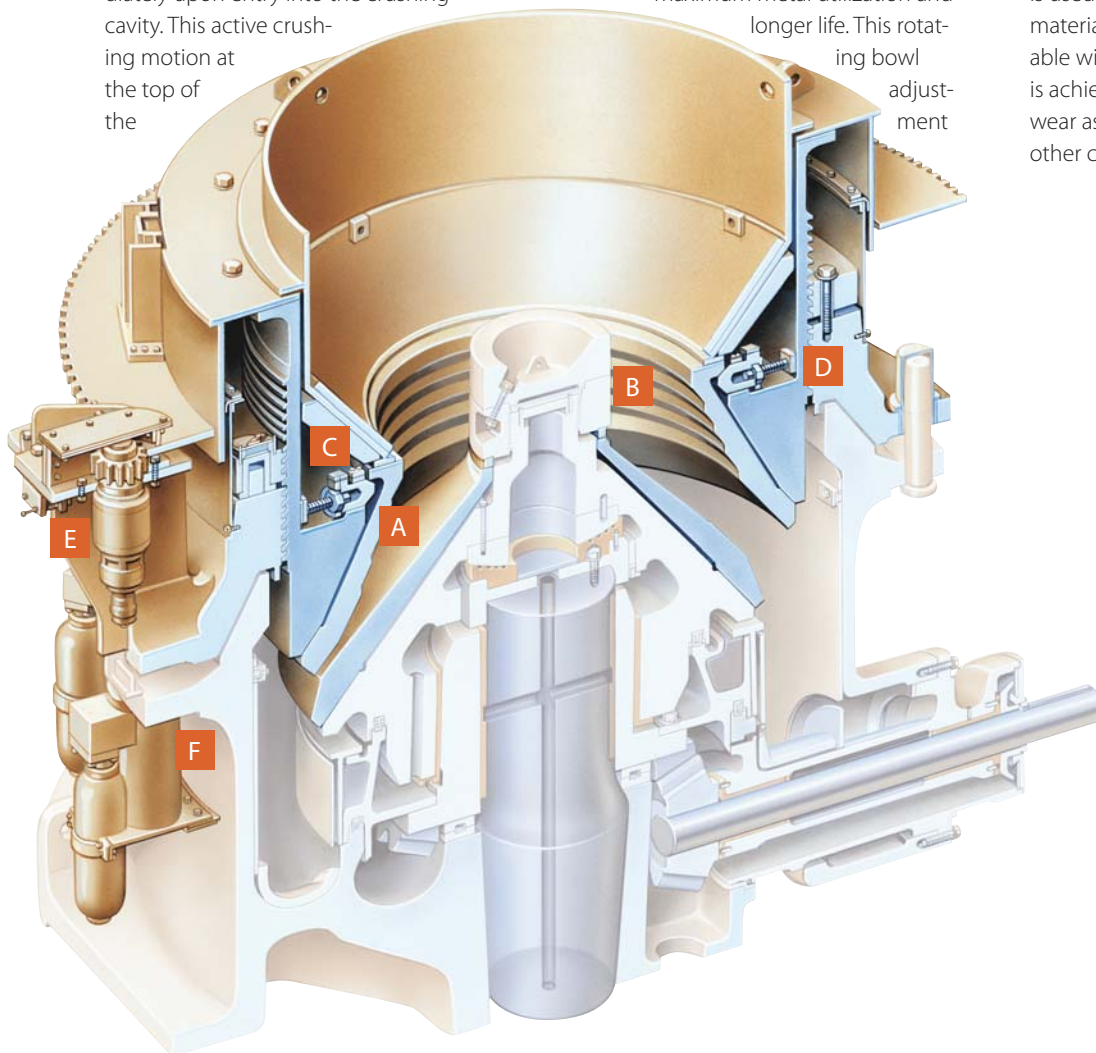
C Bowl-retaining wedges engage a self-tightening helix on the upper section of the bowl liner. This helix/wedge retention system is both simple and reliable.

D Setting adjustments of the crusher are achieved by rotating the bowl assembly through the threaded adjustment ring, thus bowl liners wear evenly, giving maximum metal utilization and longer life. This rotating bowl

method ensures a uniform setting is maintained, to allow consistent reduction of material as liners wear.

E Heavy-duty hydraulic motors rotate the bowl, enabling fine control of settings from remote locations. These same hydraulic motors can also rotate the bowl completely out of the adjustment ring at higher speeds for liner changes, simplifying maintenance.

F In the unlikely event production is stopped, the hydraulic clearing system is used to free the crushing cavity of material. The large clearing stroke available with the hydraulic clearing system is achievable without reliance on liner wear as is typical in systems offered by other crusher manufacturers.

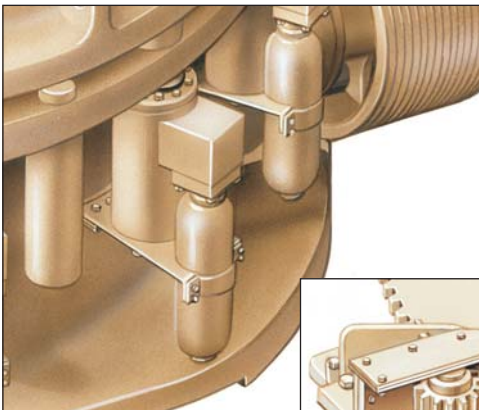


Hydraulics Assure Easy, Fast and Safe Operation

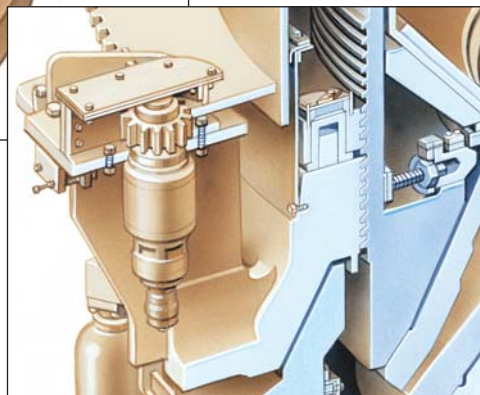
Heavy-duty hydraulic clamping cylinders provide positive securement of the bowl during crushing. Adjustment of the crusher setting while crushing is achievable using the automation features of the clamping cylinders and the heavy-duty drive motors.

Proven and reliable vibration sensors alarm the user or the automated system when an overload crushing force is encountered. Commonly, no corrective action is required as the crusher automatically returns instantaneously to delivering high crushing forces to the stone at the desired closed side setting.

Each of these functions is controlled independently from a remote hydraulic console. There is no need for the operator to be stationed near the crusher during operation. A nitrogen/hydraulic accumulator system with patented dual function hydraulic cylinders provides overload protection and a safe, quick, and easy way to prevent or clear a jammed cavity.



Hydraulic tramp release is fully automated to pass uncrushable material without disruption of production. Hydraulic accumulators ensure an instantaneous response of the hydraulics to a tramp steel condition.



A hydraulic motor facilitates complete bowl removal without the need for overhead rigging or manual means of turning it out.

Information Technology for Optimization and Control

MP Series crusher is designed for automation

The MP Series crusher is designed for automation. No other crushers have more proven or effective standard automation features than the MP cone crushers. Standard automation features include:

- State-of-the-art temperature and pressure-sensing instrumentation.
- Sensors for detection of crushing force overload.
- Automatic- or operator-activated setting adjustment systems.

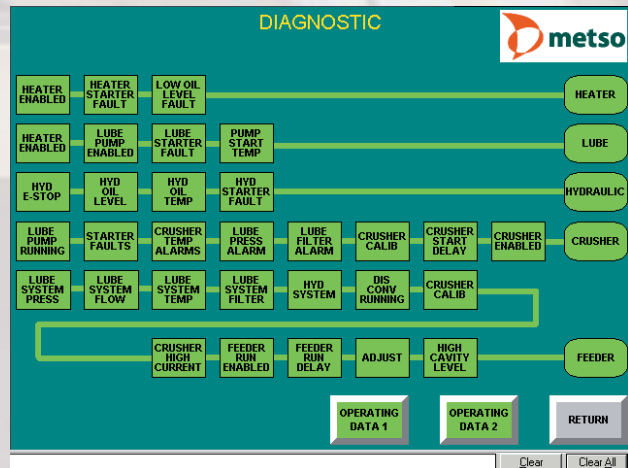
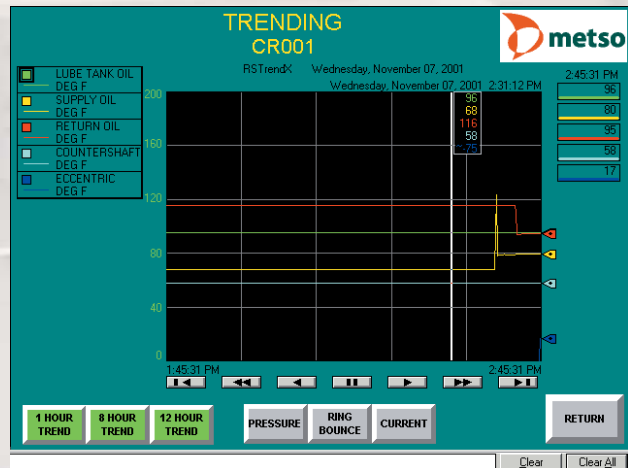
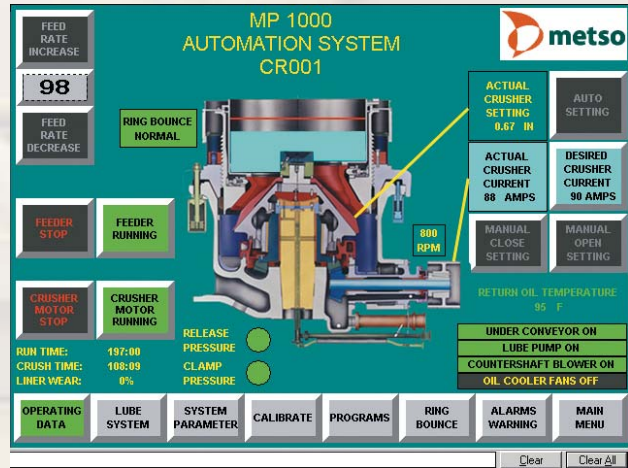
MP Series Crusher Automation Package

The optional MP Series automation package uses proven process control technology to provide optimum performance and protection for any MP crusher. High performance is achieved by constantly monitoring cavity level, power draw, and crushing force.

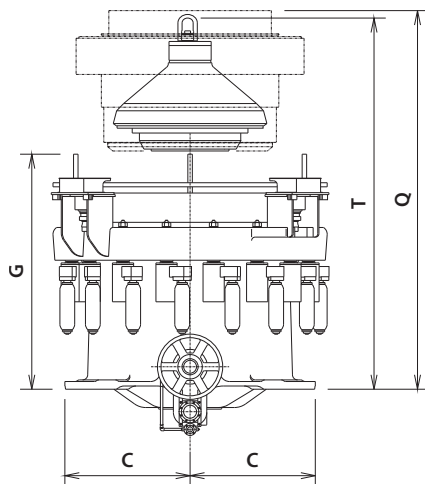
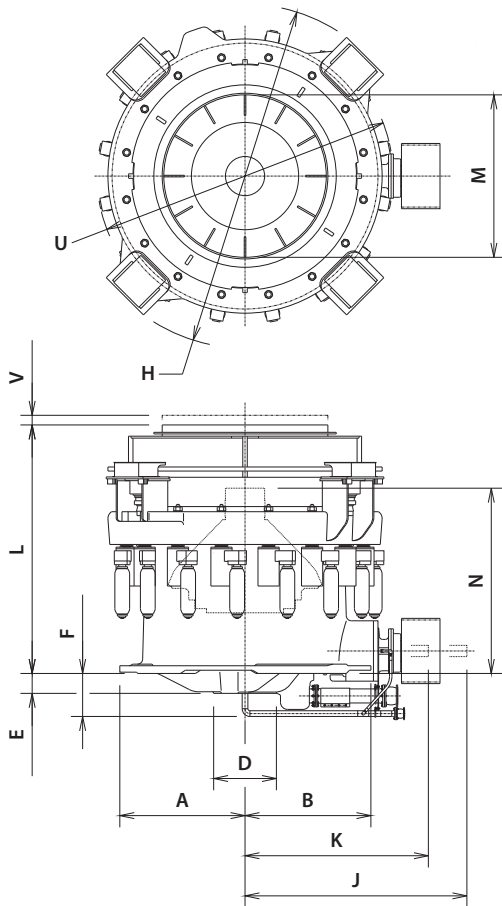
The user-friendly system gives the operator easy access to monitor and control crusher station parameters during operation.

The benefits of using Metso's automation package include:

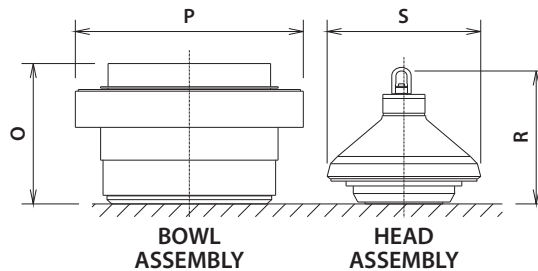
- Increased production rate by maximizing the volumetric capacity of the machine without overloading.
- Liner wear detection and indication without having to leave the control room.
- Fully automated setting adjustment regulation for maximum crushing efficiency.
- Ability to control the entire crusher station, including the feeder and discharge conveyor, from the control room.
- Overload warning and protection that signals the operator when there is a potential overload condition.
- Ability to trend various signals from the crusher, including power draw, TPH, and setting.
- Easy connection to an existing plant DCS system or PC.
- Dial-in capabilities, allowing for remote trouble-shooting and system expansion.
- On-screen diagnostics that aid the operator in trouble-shooting problems.



Clearance Dimensions



	MP1000		MP800	
	Standard	Shorthead	Standard	Shorthead
A. Crusher Centerline to Mainframe Flange	1950mm (6' 4-3/4")	1950mm (6' 4-3/4")	1750mm (5' 8-7/8")	1750mm (5' 8-7/8")
B. Crusher Centerline to Counter-shaft Housing Face	2000mm (6' 4-3/4")	2000mm (6' 4-3/4")	1750mm (5' 8-7/8")	1750mm (5' 8-7/8")
C. Crusher Centerline to Mainframe Flange	1950mm (6' 4-3/4")	1950mm (6' 4-3/4")	1750mm (5' 8-7/8")	1750mm (5' 8-7/8")
D. Main Frame Hub Diameter	975mm (3' 2-3/8")	975mm (3' 2-3/8")	875mm (2' 10-7/16")	875mm (2' 10-7/16")
E. Base to Bottom of Main Frame Hub	310mm (1' 0-3/16")	310mm (1' 0-3/16")	280mm (11")	280mm (11")
F. Base to Bottom of Oil Piping	670mm (2' 2-3/8")	670mm (2' 2-3/8")	762mm (2' 6")	762mm (2' 6")
G. Base to Top of Turning Brackets	3660mm (12' 0-1/8")	3660mm (12' 0-1/8")	3385mm (11' 1-1/4")	3385mm (11' 1-1/4")
H. Adjustment Ring Maximum Diameter	5360mm (17' 7")	5360mm (17' 7")	4550mm (14' 11-1/8")	4550mm (14' 11-1/8")
J. Clearance Required to Remove Counter-shaft Assembly	4320mm (14' 2-1/16")	4320mm (14' 2-1/16")	3881mm (12' 8-13/16")	3881mm (12' 8-13/16")
K. Crusher Centerline to End of Counter-shaft	2855mm (9' 4-3/8")	2855mm (9' 4-3/8")	2538mm (8' 3-15/16")	2538mm (8' 3-15/16")
L. Maximum Height From Base to Top of Feed Hopper	3870mm (12' 8-3/8")	3857mm (12' 7-7/8")	3860mm (12' 8")	3752mm (12' 3-3/4")
M. Inside Diameter of Feed Hopper	2530mm (8' 3-5/8")	2490mm (8' 2-1/16")	2210mm (7' 3")	2110mm (6' 11-1/16")
N. Base to Top of Feed Plate	2885mm (9' 5-9/16")	2885mm (9' 5-9/16")	2758mm (9' 0-5/8")	2758mm (9' 0-5/8")
O. Overall Height of Bowl Assembly	2186mm (7' 2-1/16")	2180mm (7' 1-13/16")	2133mm (7' 0")	1964mm (6' 5-5/16")
P. Adjustment Cap Maximum Diameter	3550mm (11' 7-3/4")	3550mm (11' 7-3/4")	3170mm (10' 4-13/16")	3170mm (10' 4-13/16")
Q. Clearance required for Removing Bowl Assembly	5896mm (19' 4-1/8")	5890mm (19' 3-7/8")	5290mm (17' 4-1/4")	5044mm (16' 9-9/16")
R. Overall Height of Head Assembly	2070mm (6' 9-1/2")	2070mm (6' 9-1/2")	2110mm (6' 11-1/16")	2110mm (6' 11-1/16")
S. Head or Mantle Maximum Diameter	2392mm (7' 10-3/16")	2353mm (7' 8-5/8")	2114mm (6' 11-1/4")	2083mm (6' 10")
T. Clearance Required for Removing Head Assembly	5780mm (18' 11-9/16")	5780mm (18' 11-9/16")	5330mm (17' 5-13/16")	5330mm (17' 5-13/16")
U. Tramp Release Side to Side	4610mm (15' 1-1/2")	4610mm (15' 1-1/2")	4280mm (14' 0-1/2")	4280mm (14' 0-1/2")
V. Additional Upward Travel Due to Clearing Stroke	150mm (5-15/16")	150mm (5-15/16")	163mm (6-7/16")	163mm (6-7/16")



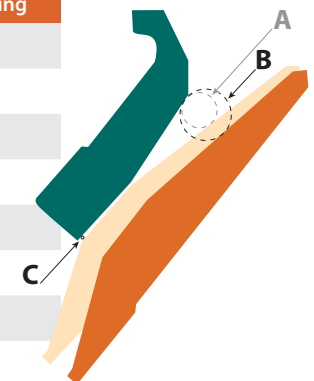
Weights - Complete Crusher and Assemblies

Standard and Short Head	MP1000		MP800	
	Lb.	Kg.	Lb.	Kg.
Crusher Complete	337,604	153,134	265,850	120,570
Main Frame Assembly, Including Main Shaft and Main Frame Liner	109,000	49,441	91,400	41,450
Bowl Assembly, Including Bowl Liner, Adjustment Cap and Hopper	73,000	33,112	57,340	26,000
Adjustment Ring, Clamping Ring, Clamping Cylinders and Adjustment Mechanism	68,322	30,990	37,825	17,157
Head Assembly, Mantel and Feed Plate	38,742	17,573	35,200	15,960
Counter-shaft Box, Counter-shaft and Crusher Sheave	9,067	4,113	7,045	3,195
Mantle	12,209	5,538	13,320	6,000
Bowl Liner	12,869	5,837	16,450	7,460
Hydraulic Power Unit	2,670	1,211	2,480	1,125
Package Lube System (Air Cooled)	— Dry Weight (No Oil)	7,700	3,492	7,700
	— Weight with Full Oil Tank*	11,300	5,125	11,300
Package Lube System (Water Cooled)	— Dry Weight (No Oil)	8,920	4,046	8,920
	— Weight with Full Oil Tank*	12,520	5,678	12,520
Skid Mounted Air Coolers	— Dry Weight (No Oil)	6,020	2,730	4,600
	— Weight with Oil	6,658	3,020	5,100

*(1,893 Liters) — (500 Gallons)

Crusher Cavity Selection

MP800	Closed Feed Opening A	Opening Feed Opening B	Closed Side Setting Dimension C	Minimum Compression Ratio at Feed Opening
Shorthead Fine	40mm	91mm	6mm	2.28
Shorthead Medium	68mm	117mm	6mm	1.72
Shorthead Coarse	113mm	162mm	12mm	1.43
Standard Extra Fine	144mm	193mm	19mm	1.34
Standard Fine	241mm	282mm	19mm	1.17
Standard Medium	308mm	347mm	25mm	1.13
Standard Coarse	343mm	384mm	32mm	1.12
MP1000	Closed Feed Opening A	Opening Feed Opening B	Closed Side Setting Dimension C	Minimum Compression Ratio at Feed Opening
Shorthead Fine	64mm	128mm	8mm	2.00
Shorthead Medium	104mm	169mm	10mm	1.63
Shorthead Coarse	140mm	203mm	10mm	1.45
Shorthead Extra Fine	241mm	295mm	22mm	1.22
Standard Fine	242mm	300mm	25mm	1.24
Standard Medium	343mm	390mm	32mm	1.14
Standard Coarse	360mm	414mm	38mm	1.15



The MP Crushers are unmatched in their flexibility to adapt to a wide range of crushing conditions. The minimum compression ratio shown above indicates that crushing begins at the feed opening. Due to the Symons principle of crushing, the minimum compression ratio increases with liner wear.

Crusher Capacities

	Sieve	CSS=50mm	CSS=38mm	CSS=25mm	CSS=19mm	CSS=13mm
	90mm	97—100	100			
	75mm	92—98	99—100	100		
	50mm	67—81	86—94	99—100		
	38mm	54—64	68—78	92—98	100—100	100
	25mm	38—45	48—54	65—80	94—98	99—100
	19mm	30—35	37—42	51—62	82—90	96—99
	16mm	25—29	31—35	43—53	73—82	92—97
	13mm	22—25	26—29	35—44	63—73	83—93
	10mm	18—21	22—24	28—34	52—61	70—91
	6mm	13—14	15—16	19—23	36—44	50—57
MP800	MTPH	1460—1935	1100—1285	735—980	580—690	495—585
MP1000	MTPH	1830—2420	1375—1750	915—1210	720—900	615—730

Cone crusher capacity charts are developed for use as an application tool to properly utilize the MP crusher's capabilities. The capacity figures shown apply to material weighing 100 pounds per cubic foot or 1600 Kg per cubic meter. The crusher is one component of the circuit. As such, its performance is in part dependent on the proper selection and operation of feeders, conveyors, screens, supporting structure, electric motors, drive component and surge bins.

Where used, attention to the following factors will enhance crusher capacity and performance:

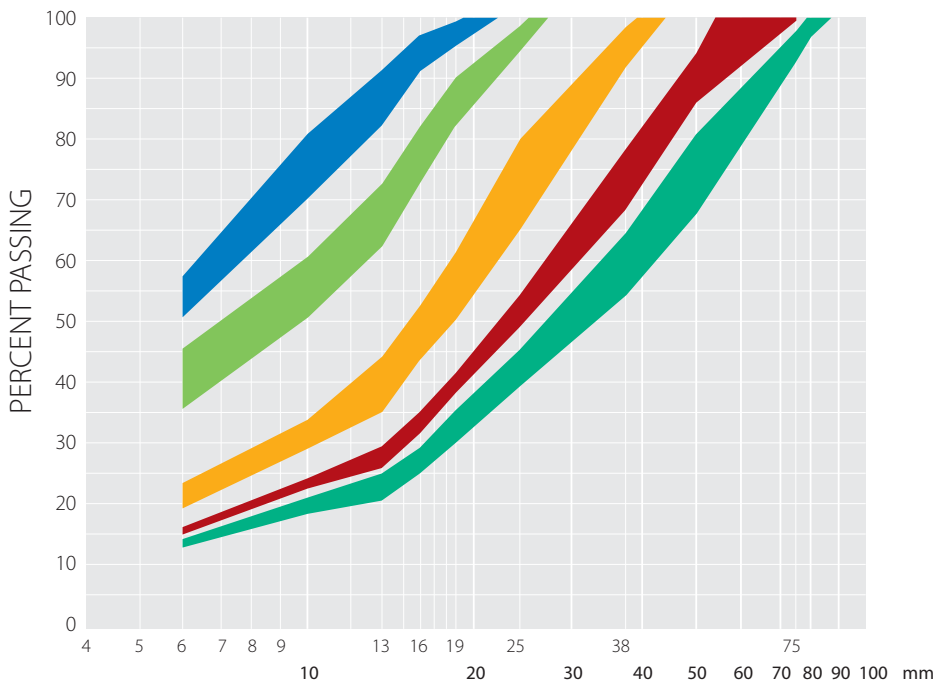
1. Proper selection of crushing chamber for material to be crushed.
2. A feed grading containing proper distribution of the particle sizes.
3. Controlled feed rate.
4. Proper feed distribution 360° around crushing chamber.
5. Discharge conveyor sized to carry maximum crusher capacity.
6. Properly sized scalping and closed circuit screens.
7. Automation controls.
8. Adequate crusher discharge area.

The following factors will detract from crusher capacity and performance:

1. Sticky material in crusher feed.
2. Fines in crusher feed (smaller than crusher setting) exceeding 10% of crusher capacity.
3. Excessive feed moisture.
4. Feed segregation in crusher cavity.
5. Improper feed distribution around circumference of crusher cavity.
6. Lack of feed control.
7. Inefficient use of recommended connected horsepower.
8. Insufficient conveyor capacity.
9. Insufficient scalper and closed circuit screen capacities.
10. Insufficient crusher discharge area.
11. Extremely hard or tough material.
12. Operation of crusher at less than recommended full load counter-shaft speed.

The capacities and gradations shown in the tables are based on results obtained from installations worldwide, crushing hard and competent ores, rocks and minerals. To determine effect of individual conditions, consult Metso.

Gradation Curves





Metso Crushing Equipment and Services

Unit Crushers

- C Series jaw crushers
- Primary gyratory crushers
- GP Series cone crushers
- HP Series cone crushers
- MP Series cone crushers
- NP Series horizontal impact crushers
- B- and V-Series vertical shaft impact crushers
- Laboratory crushers

Mobile Equipment

- LT Series mobile crushing plants
- NW Series portable plants

Complete Plants

- Complete plants for aggregate production
- Complete plants for recycling

Services

- Annual service agreements
- Breakdown assistance
- Equipment inspections
- Machine upgrades/retrofits
- Operations and maintenance training
- Replacement parts
- Service life extension projects
- Start-Up assistance/commissioning
- Troubleshooting services
- Equipment performance optimization
- Wear optimization

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